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09/998,248	11/30/2001	Purushothama Rao	214723	5682

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EXAMINER	
ALEJANDRO, RAYMOND	

ART UNIT	PAPER NUMBER
1745	

DATE MAILED: 04/13/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/998,248	RAO, PURUSHOTHAMA	
	Examiner	Art Unit	
	Raymond Alejandro	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01/15/04 & 02/13/04*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 2* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 and 2* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 January 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

This communication is in response to the amendments filed 01/15/04 and 02/13/04. The applicant has overcome most of the objections, and the 35 USC 102/103 rejection. Refer to the foregoing amendments for specific details on applicant's rebuttal arguments. However, the present claims are finally rejected over art as seen below and for the reasons of record:

Claim Objections

1. Claim 2 is objected to because of the following informalities: the claim does not provide sufficient antecedent basis for the limitation "the rolled strip". Appropriate correction is required.

Double Patenting

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

3. Claim 1 is rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-4 of U.S. Patent No. 5691087 in view of Fujisawa et al 5342698. Although the conflicting claims are not identical, they are not patentably distinct

from each other because of the following reasons:

The US'087 patent claims the following (CLAIMS 1-4):

> **1. A sealed, lead-acid cell comprising a container normally sealed from the atmosphere in service, at least one positive plate and a negative plate disposed within said container, a separator disposed within said container and separating said positive and negative plates, and an electrolyte substantially completely absorbed in said separator and said plates, said positive plate comprising a grid supporting structure having a layer of active material pasted thereto, said grid supporting structure comprising a lead-based alloy consisting essentially of lead, from about 0.025% to about 0.06% calcium, from about 0.3% to about 0.9% tin, and from about 0.025% to about 0.045% silver, the percentages being based upon the total weight of said lead-based alloy.**
>
> **2. The cell of claim 1, wherein the calcium content of said lead-based alloy is in the range of about 0.025% to about 0.05%.**
>
> **3. The cell of claim 1, wherein the tin content of said lead-based alloy is in the range of about 0.4% to about 0.6%.**
>
> **4. The cell of claim 1, wherein the silver content of said lead-based alloy is in the range of about 0.025% to about 0.045%.**

In this case, it is noted that the combination of claims 1 and 3 provides an obvious variation satisfying the specific weight percent of silver as instantly claimed.

The US'087 patent claims a lead-acid cell (battery) according to the foregoing aspects. However, the US'087 patent does not expressly disclose/claim the specific lead-based alloy structure.

In this respect, Fujisawa et al disclose examples of metal crystals having a face-centered cubic structure are alloys crystals such as Pb (COL 4, lines 58-63). In particular, Fujisawa et al disclose a Pb based alloy containing Sn as a requisite alloy element and if necessary, may contain Ag and Ca (COL 7, lines 52-62).

It is disclosed that if the crystal face is oriented in the direction perpendicular to the (h00) plane in this manner, the atomic density in the direction of the orientation becomes high because the crystal structure of the Pb alloy is face-centered cubic structure. Therefore, the alloy material

has an increased hardness to exhibit enhanced seizure and wear resistance (COL 14, lines 52-59). It is further disclosed that from the respect that the first oriented crystal a face-centered cubic structure due to the orientation of the (h00) plane, the atomic density is increased in the direction of the orientation, so that the surface material (the alloy per se) has an increased hardness, thereby assuring an enhanced wear resistance of the alloy material (COL 8, lines 44-52).

In view of the above, it would have been obvious to one skilled in the art at the time the invention was made to make the specific lead-based alloy structure of the US'087 patent as taught by Fujisawa et al as Fujisawa et al discloses that Pb based alloys having a face-centered cubic structure exhibit a crystal face oriented in the direction perpendicular to the (h00) plane and in this manner, the atomic density in the direction of the orientation becomes high because of the same crystal structure. Therefore, the alloy material has an increased hardness to exhibit enhanced seizure and wear resistance (COL 14, lines 52-59/ COL 8, lines 44-52). *Moreover, both the US'087 patent and Fujisawa et al address and resolve the same problem of providing Pb-based alloys containing Sn, Ag and Ca to exhibit an increased hardness. Thus, those skilled in the art would find sufficient motivation to combine the foregoing references as they both disclose useful Pb-based alloys and focus on the same technical setback related to alloy hardness. Accordingly, since Fujisawa et al directly teach the use of Pb-based alloys containing Sn, Ag and Ca, the examiner impartially upholds and remarks that the cited reference is reasonably pertinent to the particular problem with which the inventor is concerned.*

4. Claim 1 is rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 5 and 7 of U.S. Patent No. 5874186 in view of

Fujisawa et al 5342698. Although the conflicting claims are not identical, they are not patentably distinct from each other because of the following reasons:

The US'186 patent claims the following (CLAIMS 1, 5 and 7):

1. A starting, lighting and ignition lead-acid battery which comprises a container divided into a plurality of cells, a battery element disposed in each of said cells, each battery element comprising a plurality of electrodes and separators, and each cell being electrically connected together, at least some of said electrodes comprising an electrically conductive, directly cast strip grid comprising a top frame bar having a plate lug, a bottom frame bar and grid mesh connecting said top and bottom frame bars, said grid having no vertical frame bars, said grid being of an alloy composition consisting essentially of from about 0.030% to 0.050% calcium, about 0.65% to 1.25% tin, about 0.018% to 0.030% silver, and the remainder lead, the percentages being based upon the total weight of the grid.

5. A sealed, lead-acid cell comprising a container normally sealed from the atmosphere in service, at least one positive plate and a negative plate disposed within said container, a separator disposed within said container and separating said positive and negative plates, and an electrolyte substantially completely absorbed in said separator and said plates, said positive plate comprising a gravity cast, grid-supporting structure having a layer of active material pasted thereto, said grid supporting structure comprising a lead-based alloy consisting essentially of lead, from about 0.035% to about 0.055% calcium, from about 0.95% to about 1.45% tin, and from about 0.018% to about 0.030% silver, the percentages being based upon the total weight of said lead-based alloy.

7. A sealed, lead-acid cell, comprising a container normally sealed from the atmosphere in service, at least one positive plate and a negative plate disposed within said container, a separator disposed within said container and separating said positive and negative plates, and an electrolyte substantially completely absorbed in said separator and plates, said positive plate comprising a directly cast strip, grid-supporting structure, having a layer of active material pasted thereto, said grid-supporting structure comprising a lead-based alloy consisting essentially of lead, from about 0.030% to about 0.050% calcium, from about 0.95% to about 1.25% tin, and from about 0.017% to about 0.030% silver, the percentages being based upon the total weight of said lead-based alloy.

The US'186 patent claims a lead-acid cell (battery) according to the foregoing aspects. However, the US'186 patent does not expressly disclose/claim the specific lead-based alloy structure.

Fujisawa et al disclose examples of metal crystals having a face-centered cubic structure are alloys crystals such as Pb (COL 4, lines 58-63). In particular, Fujisawa et al disclose a Pb based alloy containing Sn as a requisite alloy element and if necessary, may contain Ag and Ca (COL 7, lines 52-62).

It is disclosed that if the crystal face is oriented in the direction perpendicular to the (h00) plane in this manner, the atomic density in the direction of the orientation becomes high because the crystal structure of the Pb alloy is face-centered cubic structure. Therefore, the alloy material has an increased hardness to exhibit enhanced seizure and wear resistance (COL 14, lines 52-59). It is further disclosed that from the respect that the first oriented crystal a face-centered cubic structure due to the orientation of the (h00) plane, the atomic density is increased in the direction of the orientation, so that the surface material (the alloy per se) has an increased hardness, thereby assuring an enhanced wear resistance of the alloy material (COL 8, lines 44-52).

In view of the above, it would have been obvious to one skilled in the art at the time the invention was made to make the specific lead-based alloy structure of the US'186 patent as taught by Fujisawa et al as Fujisawa et al discloses that Pb based alloys having a face-centered cubic structure exhibit a crystal face oriented in the dircction perpendicular to the (h00) plane and in this manner, the atomic density in the direction of the orientation becomes high because of the same crystal structure. Therefore, the alloy material has an increased hardness to exhibit enhanced seizure and wear resistance (COL 14, lines 52-59/ COL 8, lines 44-52). *Moreover, both the US'186 patent and Fujisawa et al address and resolve the same problem of providing Pb-based alloys containing Sn, Ag and Ca to exhibit an increased hardness. Thus, those skilled in the art would find sufficient motivation to combine the foregoing references as they both*

disclose useful Pb-based alloys and focus on the same technical setback related to alloy hardness. Accordingly, since Fujisawa et al directly teach the use of Pb-based alloys containing Sn, Ag and Ca, the examiner impartially upholds and remarks that the cited reference is reasonably pertinent to the particular problem with which the inventor is concerned.

5. Claim 1 is rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1 of U.S. Patent No. 6180286 in view of Fujisawa et al 5342698. Although the conflicting claims are not identical, they are not patentably distinct from each other because of the following reasons:

The US'286 patent claims the following (CLAIMS 1):

> **1.** A starting, lighting and ignition lead-acid battery which comprises a container divided into a plurality of cells, a battery element disposed in each of said cells, each battery element comprising a plurality of electrodes and separators, and each cell being electrically connected together, at least some of said electrodes comprising an electrically conductive, said grid being of an alloy composition consisting essentially of from about 0.030% to 0.050% calcium, about 0.65% to 1.25% tin, about 0.018% to 0.030% silver, and the remainder lead, the percentages being based upon the total weight of the grid.

The US'286 patent claims a lead-acid battery according to the foregoing. However, the preceding reference does not expressly disclose/claim the specific lead-based alloy structure.

Fujisawa et al disclose examples of metal crystals having a face-centered cubic structure are alloys crystals such as Pb (COL 4, lines 58-63). In particular, Fujisawa et al disclose a Pb based alloy containing Sn as a requisite alloy element and if necessary, may contain Ag and Ca (COL 7, lines 52-62).

It is disclosed that if the crystal face is oriented in the direction perpendicular to the (h00) plane in this manner, the atomic density in the direction of the orientation becomes high because the crystal structure of the Pb alloy is face-centered cubic structure. Therefore, the alloy material has an increased hardness to exhibit enhanced seizure and wear resistance (COL 14, lines 52-59). It is further disclosed that from the respect that the first oriented crystal a face-centered cubic structure due to the orientation of the (h00) plane, the atomic density is increased in the direction of the orientation, so that the surface material (the alloy per se) has an increased hardness, thereby assuring an enhanced wear resistance of the alloy material (COL 8, lines 44-52).

In view of the above, it would have been obvious to one skilled in the art at the time the invention was made to make the specific lead-based alloy structure of the US'286 patent as taught by Fujisawa et al as Fujisawa et al discloses that Pb based alloys having a face-centered cubic structure exhibit a crystal face oriented in the direction perpendicular to the (h00) plane and in this manner, the atomic density in the direction of the orientation becomes high because of the same crystal structure. Therefore, the alloy material has an increased hardness to exhibit enhanced seizure and wear resistance (COL 14, lines 52-59/ COL 8, lines 44-52). *Moreover, both the US'286 patent and Fujisawa et al address and resolve the same problem of providing Pb-based alloys containing Sn, Ag and Ca to exhibit an increased hardness. Thus, those skilled in the art would find sufficient motivation to combine the foregoing references as they both disclose useful Pb-based alloys and focus on the same technical setback related to alloy hardness. Accordingly, since Fujisawa et al directly teach the use of Pb-based alloys containing Sn, Ag and Ca, the examiner impartially upholds and remarks that the cited reference is reasonably pertinent to the particular problem with which the inventor is concerned.*

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1-2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rao et al 5691087 in view of Fujisawa et al 5342698.

The instant application is directed to a lead acid battery comprising a positive plate having a grid comprising a specific alloy composition and structure. Other limitations include the heat aging process.

With respect to claim 1:

Rao et al'087 disclose a lead acid cell which comprises a battery element comprising a plurality of electrodes, and separators wherein the positive electrode is a positive grid and the negative electrode is a negative grid (COL 11, lines 31-46/ABSTRACT). It is also disclosed that the electrode plates 94 and 96 are separated by separators 98 (COL 19, lines 19-21).

Rao et al'087 teach the lead-acid cell including positive plates made from an alloy consisting essentially of lead, from about 0.025 % to about 0.06% calcium, from about 0.3 % to about 0.9 % tin, and from about 0.015 % to about 0.045 % silver (ABSTRACT).

[57] **ABSTRACT**

A sealed lead-acid cell or battery includes positive plates made from an alloy consisting essentially of lead, from about 0.025% to about 0.06% calcium, from about 0.3% to about 0.9% tin, and from about 0.015% to about 0.045% silver.

Example 1 shows positive grids cast from alloys wherein the cast grid has the following compositions (COL 20, lines 40-45 & Col 22, lines 18-21):

a) Alloy 1: 0.029 % Ca, 0.049 % tin, 0.032 % silver and the remainder lead (Col 20, lines 40-45);

b) Alloy 2: 0.045 % Ca, 0.048 % tin, 0.031 % silver and the remainder lead (Col 20,lines 40-45);

following compositions: Alloy 1 (0.029% calcium, 0.49% tin, 0.032% silver and the remainder lead), Alloy 2 (0.045% calcium, 0.48% tin, 0.031 silver and the remainder lead), and

c) Alloy 3: 0.037 % Ca, 0.045 % tin, 0.032 % silver and the remainder lead (Col 22, lines 18-21).

using Alloy 3, an alloy according to the present invention (i.e.—the alloy composition of the cast grid was 0.037% calcium, 0.45% tin, 0.032% silver and the balance lead):

*Therefore, a specific example in the prior art which is within the claimed range anticipates the range (**See MPEP 2131.03 Anticipation of Ranges**).*

With respect to claim 2:

Rao et al'087 also disclose alloy composition used to make rolled, or wrought strip (COL 13, lines 3-9). Rao et al'087 disclose forming a continuous strip by rolling techniques and then converting such strip into battery grids (COL 13, lines 10-13/COL 13, lines 43-47/ COL 14, lines 31-35/COL 15, lines 55-58). *Thus, Rao et al'087 do disclose a rolled alloy strip.*

Rao et al'087 disclose that cast strips that are rolled by various means to provide a strip of the desired thickness exhibit the similar type of orientation of the grain boundaries as in directly cast strips (COL 13, lines 45-18). That is to say, the cast strip employed to make the positive plates exhibit the expected orientation of the grain boundaries in the alloy which results from the process (COL 13, lines 35-42). *Thus, rolled strip exhibits grain boundaries*. It is further disclosed that the positive battery grids are characterized by adequate age-hardening responses

(COL 10, lines 51-55) and heat treating the resulting grids made by expanded grid fabrication techniques (COL 18, lines 12-22).

Rao et al'087 disclose a lead-acid battery according to the foregoing. However, the preceding prior art does not expressly disclose the specific lead-based alloy structure.

Fujisawa et al disclose examples of metal crystals having a face-centered cubic structure are alloys crystals such as Pb (COL 4, lines 58-63). In particular, Fujisawa et al disclose a Pb based alloy containing Sn as a requisite alloy element and if necessary, may contain Ag and Ca (COL 7, lines 52-62).

It is disclosed that if the crystal face is oriented in the direction perpendicular to the (h00) plane in this manner, the atomic density in the direction of the orientation becomes high because the crystal structure of the Pb alloy is face-centered cubic structure. Therefore, the alloy material has an increased hardness to exhibit enhanced seizure and wear resistance (COL 14, lines 52-59). It is further disclosed that from the respect that the first oriented crystal a face-centered cubic structure due to the orientation of the (h00) plane, the atomic density is increased in the direction of the orientation, so that the surface material (the alloy per se) has an increased hardness, thereby assuring an enhanced wear resistance of the alloy material (COL 8, lines 44-52).

In view of the above, it would have been obvious to one skilled in the art at the time the invention was made to make the specific lead-based alloy structure of Rao et al'087 as taught by Fujisawa et al as Fujisawa et al discloses that Pb based alloys having a face-centered cubic structure exhibit a crystal face oriented in the direction perpendicular to the (h00) plane and in this manner, the atomic density in the direction of the orientation becomes high because of the same crystal structure. Therefore, the alloy material has an increased hardness to exhibit

enhanced seizure and wear resistance (COL 14, lines 52-59/ COL 8, lines 44-52). *Moreover, both Rao et al'087 and Fujisawa et al address and resolve the same problem of providing Pb-based alloys containing Sn, Ag and Ca to exhibit an increased hardness. Thus, those skilled in the art would find sufficient motivation to combine the foregoing references as they both disclose useful Pb-based alloys and focus on the same technical setback related to alloy hardness. Accordingly, since Fujisawa et al directly teach the use of Pb-based alloys containing Sn, Ag and Ca, the examiner impartially upholds and remarks that the cited reference is reasonably pertinent to the particular problem with which the inventor is concerned.*

Response to Arguments

8. Applicant's arguments, see the amendments dated filed 01/15/04 and 02/13/04, with respect to the rejection(s)of claim(s) 1-2 under the 35 USC 102/103 statutes have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made as seen above.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Alejandro whose telephone number is (571) 272-1282. The examiner can normally be reached on Monday-Thursday (8:00 am - 6:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Raymond Alejandro
Examiner
Art Unit 1745